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CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society
Of America

Vol. II

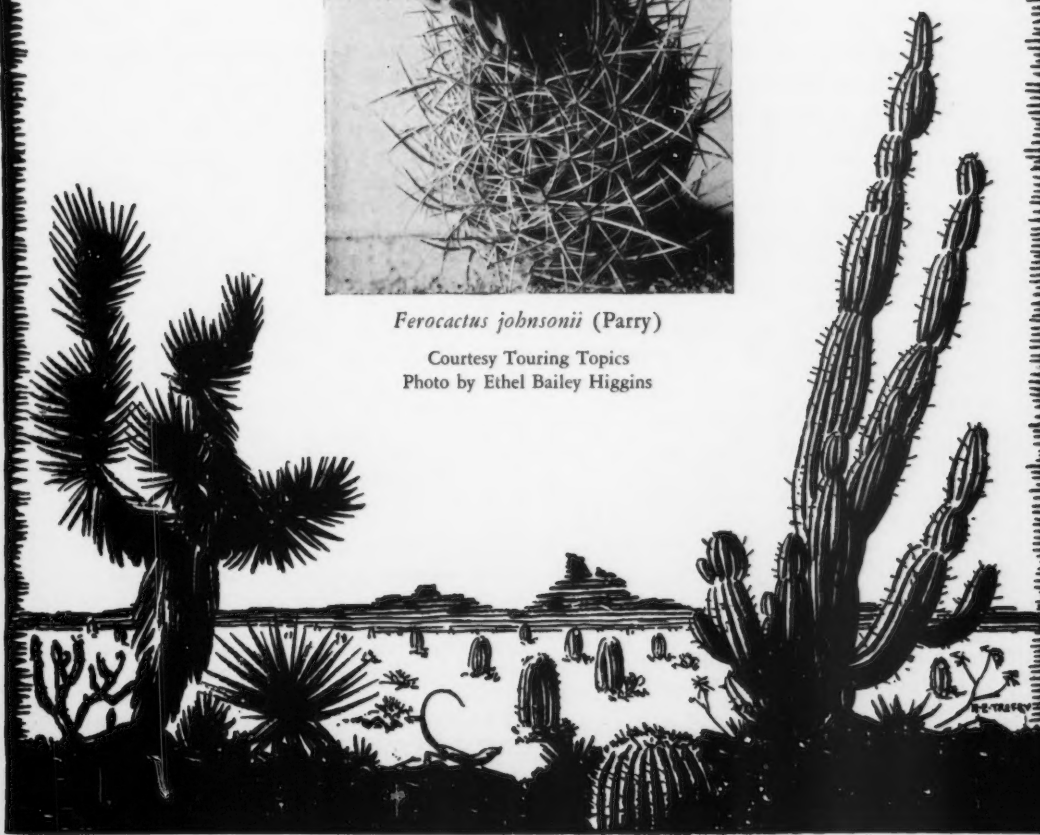
MARCH, 1931

No. 9



Ferocactus johnsonii (Parry)

Courtesy Touring Topics
Photo by Ethel Bailey Higgins



Journal of the

CACTUS AND SUCCULENT SOCIETY OF AMERICA

Published by

THE CACTUS AND SUCCULENT SOCIETY OF AMERICA

EDITORIAL OFFICE: 6162 Pasadena Ave., Los Angeles, Calif.

A monthly magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. "The Cactaceae," by N. L. Britton and J. N. Rose, has been adopted by this Journal for purposes of identification. (Membership and subscription \$3.00 per year, foreign \$3.50.) Mail membership application and subscription to the Secretary, Mr. W. M. Ketteringham, 610 West 65th Street, Los Angeles, Calif.

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The Cactaceae of Tehuacan¹

By N. L. BRITTON

The deserts of Tehuacan, in the states Puebla and Oaxaca, contain many species of plants of great interest, with a high percentage of endemism. Many of these were made known through the work of the earlier botanists and collectors, and the region was more recently explored by Doctor Rose and his assistants in 1905.

Professor Bravo has now given us detailed Spanish descriptions of the Cactaceae of the region, illustrated by good original photographs. The genera, and the numbers of native species are as follows:

<i>Nopalea</i>	1	<i>Myrtillocactus</i>	2
<i>Opuntia</i>	6	<i>Hylocereus</i>	1
<i>Cephalocereus</i>	4	<i>Ferocactus</i>	5
<i>Escontria</i>	1	<i>Echinocactus</i>	1
<i>Pachycereus</i>	3	<i>Coryphantha</i>	1
<i>Lemaireocereus</i>	6	<i>Pelecyphora</i>	1
<i>Wilcoxia</i>	1	<i>Neomammillaria</i>	7

40

Opuntia boffmanni Bravo, is described as a species new to Science, collected by Professor Carlos C. Hoffman, distinguished entomologist of the University of Mexico, between Tehuacan

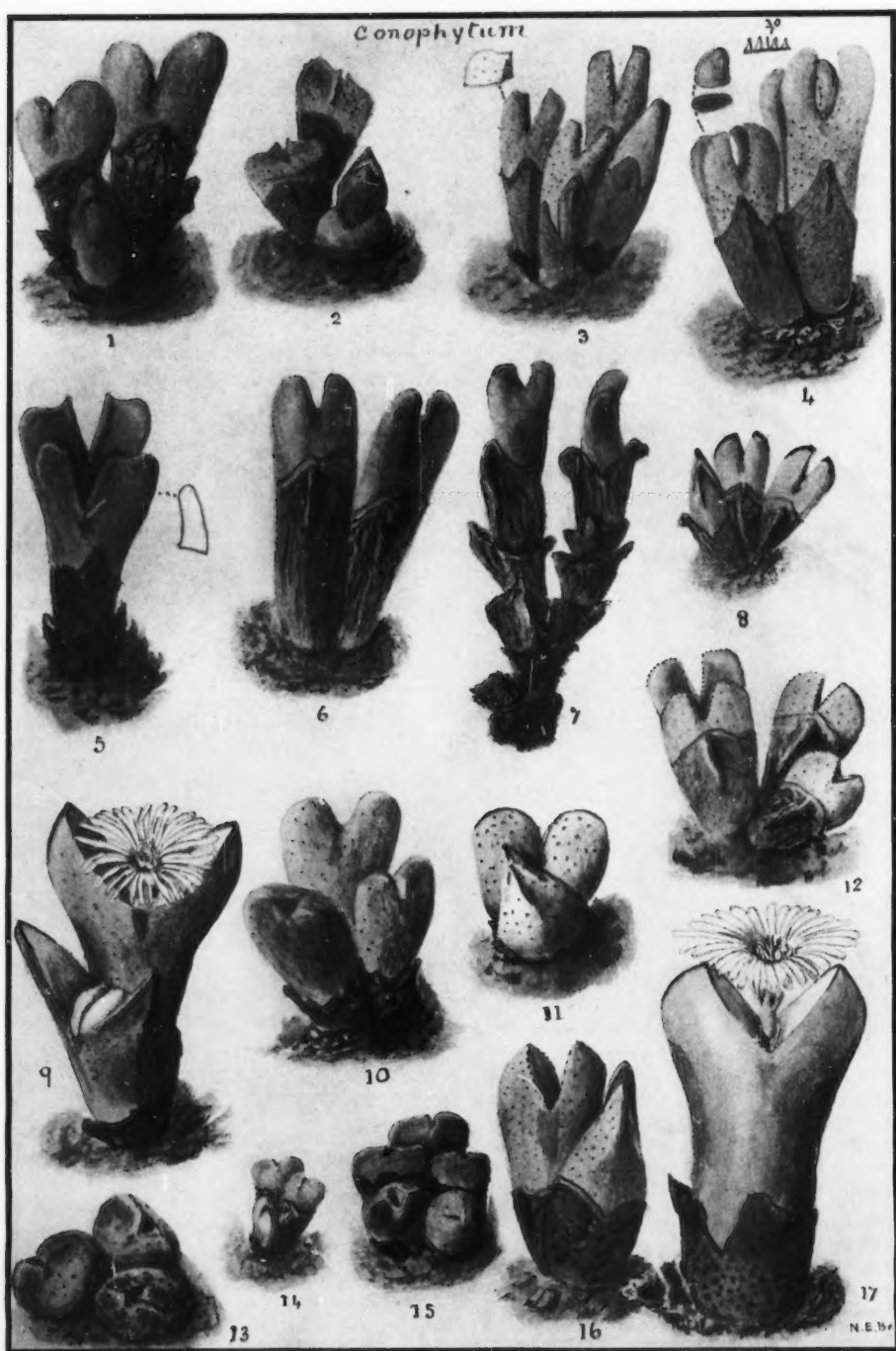
and Zapotitlan. It is a number of the Series PUMILAE, and Professor Bravo discusses its relationship to *O. pumila* Rose and *O. pubescens* Wendl., its closest allies. Doctor Rose collected specimens of an *Opuntia* on a limestone hillside at El Riego, near Tehuacan in 1905, which appear to agree with the description and illustration published by Professor Bravo (*Rose, Painter & Rose* 9933); he included these in *O. pubescens*.

Professor Bravo diverges from "The Cactaceae" at one point; this is not recognizing the genus *Solisia* Britton and Rose, with its monotype *S. pectinata* (B. Stein) Britton & Rose, endemic in the Tehuacan desert. She returns to the former inclusion of this species in the genus *Pelecyphora* Ehrenberg, monotypic in *P. aselliformis* Ehrenberg, of San Luis Potosí, but she does not give reasons for this different treatment. The comparative characters of the two genera were cited in "The Cactaceae" 4:64, and, unless needing modification, still appear to be quite sufficient to differentiate them. Need for the extension of influence of the International Desert Preservation League to Tehuacan is evidenced by Professor Bravo's record that this beautiful little cactus, formerly very abundant on La Mesa de San Lorenzo y del Riego, through immoderate exportation by foreign collectors, is now scarcely to be found there.

¹Helia Bravo, in *Anales del Instituto de Biología, Universidad Nacional de México*, 1:87-124, f. 1-31. 1930.

The following article by N. E. Brown of Kew Gardens, England, is one of the most valuable contributions to the JOURNAL. This work has been completed by this famous botanist after his 80th year which shows that Mr. Brown is actively continuing the recording of his many years of valuable experiences with plant-life.

EDITOR.



1. *Conophytum obtusum*, 2. *C. tectum*, 3. *C. angustum*, 4. *C. incurvum*, 5. *C. apiculatum*, 6. *C. simplum*, 7. *C. gracile*, 8. *C. rectum*, 9. *C. tumidum*, 10. *C. simile*, 11. *C. dennisii*, 12. *C. plenum*, 13. *C. quaesitum*, 14. *C. exiguum*, 15. *C. auctum*, 16. *C. springbokense*, 17. *C. pole evansii*, N. E. Br. All natural size. Sketch by author.

SOME NEW SPECIES OF CONOPHYTUM

By N. E. BROWN

On p. 344 of Volume II of the JOURNAL I gave a brief account of the genus *Conophytum* and here add a plate accompanied by descriptions of some new species, concerning which readers may like to have a little information. The species illustrated all belong to a group of the genus known as the section *Biloba*. For practically this genus contains about three distinct groups which may be usually distinguished by the following characters:

1. A group having globose, obconic, or obovoid growths, with the orifice nearly level with the top or only in a slight notch or depression. These may be considered as forming the typical group of the genus.

2. A group in which the growths are either distinctly two-lobed or sharply notched at the top, with the orifice in the notch or between the lobes, with the top of the growth either compressed as if pinched between the finger and thumb or acutely keeled or both. This group forms the section *Biloba* and is the group illustrated on the plate, all the figures being of natural size.

3. A group with the top of the growths divided by a transverse fissure into two broad lobes with flattened or convex (not keeled) tops that are more or less pellucid, serving as windows to the body of the plant. These form a section that may be called *Fenestrata*. In their extreme forms these three groups seem very distinct, but as they each gradually pass into the group typical of the genus and there is no distinction to be found in their flowers or fruit, they cannot satisfactorily be separated as distinct genera. Even among the few of the section *Biloba* illustrated here it will be noted how the smaller species, FIG. 13, *C. quaesitum*, and FIG. 15, *C. auctum*, are approximating to the typical group in form and in their orifice.

With reference to the gradual passing of one group into another, this is of course, one of the facts that demonstrate the truth of Evolution, and few plants show a direct change of form better than do these species of the section *Biloba*. For during the first two or three years of their lives when raised from seed, they are in form and markings just like typical *Conophytums*, and gradually change with age from the subglobose or broadly obconic form with a circular and convex top having a small orifice level with the

surface to the two-lobed compressed form of the typical *Biloba* section, so that by watching this development during a few years one can get a good idea of how Nature has evolved one form from another that is totally different.

The species belonging to the section *Biloba* are regarded by cultivators as among the aristocrats of the genus and much prized. Some of them increase freely by the old growths usually dividing into two new ones after flowering, as in *C. elisbae* and some of the new species here described, while others, like *C. apiatum*, rarely make additional growths and are consequently very rare in cultivation.

Where constantly exposed to full sunlight and treated with a nice hot summer, probably most of the group flower freely every year. But under the very unfavorable conditions in which I have to cultivate them they flower sparingly and spasmodically. For my house is so situated that for three winter months they receive no direct sunlight at all, and treated as they have been of late years to very sunless summers they refuse to flower properly. So that often I cultivate a plant for several years before I am able to add a representation of a flowering growth to the series of colored drawings I have been preparing during the past twenty years. That is the reason that all but two of the plants illustrated on the plate are flowerless, although some have been cultivated for two or more years, and I might possibly have to grow them for several years before some of them flower, yet as they are all very distinct species I think they can all be recognized from the illustrations.

With reference to flowering, as these plants form their flower-buds months before they are developed as flowers, my experience is that when plants are sent from South Africa to this country they have to endure being shut up in a box without moisture and a dearth of fresh air during their three weeks' journey, a trial that seems to destroy the chance of the plant perfecting its flowers until it has been in cultivation for at least two years. Only rarely does a plant flower the first year of its introduction.

Most of the species illustrated exhibit the plant as it has developed the first year of its arrival in England, and therefore the figures probably give a better idea of the appearance the plants have in their native country than if made after they had been in cultivation for a few years. For

doubtless they will increase in size and perhaps somewhat alter in appearance under the influence of our more humid atmosphere. In connection with this humidity there is a problem that does not seem very easy to understand. It is common knowledge that these plants exist and thrive under very arid conditions in South Africa, in places where the rainfall is often not more than three or four inches per annum and sometimes much less. And as Conophytums grow in crevices and hollows of rocks with very little soil and have to face a very scorching sun all day, such a small amount would very quickly be dried up. If one tried to cultivate them here in a greenhouse upon such a small annual supply of water, most of them would die of drought in spite of our humid atmosphere and want of sun heat.

I think the solution of the problem must be that at night the rocks cool rapidly and get much colder than the air, so that moisture from the latter is condensed upon the rocks and absorbed by the soil in the crevices, from which the plants get a nightly or frequent supply that enables them to withstand the extremely dry condition of the daytime. There may not be a visible dewfall, but I feel sure there must be condensation of moisture of some kind to supply these plants with the water they need or they would not survive. In a greenhouse, the warmth is retained by the pots and soil during the night and there is no condensation about them that the plants can use. Consequently, if they are not watered when they require it, they dry up and die. If the above is not the explanation of the problem what is?

Among the species of the section *Biloba*, two peculiarities are found, but which are not altogether absent from the remainder of the genus. These are:

1. That different species are sometimes so similar in appearance that unless in flower they might be easily supposed to be only different individuals of the same species, yet they may often be quite easily distinguished by the sense of touch alone. This is due to the fact that the surface-cells of some species instead of being quite even and smooth are convex, giving a smooth and yet a somewhat hard sensation to the touch; while in others they are raised into minute points, producing to the touch either a soft velvety sensation or one of harshness, according to their rigidity. These points have been described as hairs, and in a strict botanical sense are microscopic one-celled hairs, yet as they are often scarcely discernible under a low-power pocket lens such as is generally used by cultivators and who would not be likely to consider such structures as being hairs, I prefer to call



18. *Conophytum edithae*. Natural Size.

them microscopic points, for they are really microscopic, often being less in length than the thickness of a human hair which is not often less than $1/450$ of an inch in thickness and often very much thicker, while these points, in several cases where I have measured them, vary from $1/1500$ to $1/300$ of an inch long and I do not see the wisdom of misleading the ordinary cultivator by calling them hairs. These points are illustrated on the plate at FIG. 4 (*C. incurvum*), magnified about thirty diameters, for when measured I found them to be just $1/300$ of an inch in length, while those on *C. simplum*, FIG. 6, which are not represented, measured from $1/1500$ to $1/1000$ of an inch in length, yet although so minute produce a slight but distinctly velvety sensation upon touching the plant.

2. At the base of the notch between the lobes on each side of the body is a small patch of a slightly darker color than the rest of the surface, which is often translucent, as in *C. springbo-kense*, FIG. 16. The significance of this different kind of tissue is unknown to me, but it also occurs in many species of typical Conophytum, usually as a darker colored blotch at each end of the orifice, while in others it is quite absent. Although present in all I have not always mentioned it in the descriptions of the species.

It will be noticed in the drawings that most of the species are clothed at the base with the old skin which forms a sheath around the lower part. As those who have not seen these plants may not understand what part of the plant this sheath represents, I would refer them to the explanation of the curious mode of growth of this genus given on p. 345 of Volume No. II of this JOURNAL, and will here merely state that this thin skin represents the whole of the solid matter contained in one of the growths, all the rest of it being fluid matter, which has been absorbed by the new growth.

The following are the descriptions of the species:

FIG. 1. *Conophytum obtusum*, N. E. Br.

Stemless. Growths 1-1½ inches (2.5-4 cm.) high, 7-9 lines (14-20 mm.) broad at the compressed and two-lobed top, 5-6 lines (10-12 mm.) thick in the subcylindric body; lobes 2-4 lines (4-8 mm.) long, narrowly separated, flat on the inner face, rounded at the top in view and the keel also obtusely rounded; surface slightly harsh to the touch from being covered with microscopic points as seen under a strong lens, uniformly green without dots. Flowers not seen. Capsule 2½ lines (5 mm.) in diameter, with 5 valves.

Little Namaqualand, MAUGHAN BROWN, 1056.

FIG. 2. *Conophytum tectum*, N. E. Br.

Stemless. Growths about 6-9 lines (12-20 mm.) high, 4½ lines (9 mm.) broad across the compressed and acutely ridged top, and 3½ lines (7 mm.) thick in the subcylindric body, with the narrow notch between the lobes ½-1 line (1-2 mm.) deep; lobes with the face in the notch flat with sharp edges, and in side view with a slightly upturned point at the apex and a broad and shallow notch or indentation behind it; surface smooth, chalky green, sprinkled on the upper part with minute dots of darker green. Flowers and fruit not seen.

Little Namaqualand; near Springbok, MAUGHAN BROWN, 1057.

The top of the growths viewed edgewise slope so as to form an acute ridge very much like that of the roof of a house, hence the specific name.

FIG. 3. *Conophytum angustum*, N. E. Br.

Stemless. Growths slender in comparison with most species, two-lobed and compressed at the top, ¾-1 inch (2-2.5 cm.) high, 3½-5 lines (7-10 mm.) broad at the top and the subcylindric body about 3 lines (6-7 mm.) thick; lobes not diverging, 2½-4 lines (5-8 mm.) long, 1½-2 lines (3-4 mm.) broad, in side view obtusely rounded into a minute upturned point at the apex, flat on the inner face, slightly keeled on the top; surface smooth, glabrous, slightly shining, pale green, rather inconspicuously dotted, or sometimes almost without dots, on the lobes and body with slightly darker green, also with a row of dots along the margins of the notch and a reddish keel-line over the tops of the lobes. Flowers not seen. Capsule 2 lines (4 mm.) in diameter, obconic, flattish on the top, with the center slightly raised, square in outline, with 4 valves.

Little Namaqualand, MAUGHAN BROWN, 1047.

FIG. 4. *Conophytum incurvum*, N. E. Br.

Plant stemless, apparently increasing freely, as in the example seen every growth was dividing into two new ones after flowering. Growths rather slender in proportion to their height, two-lobed at the top, 1¼-1½ inches (3.2-4 cm.) high, 4½-6½ lines (9-13 mm.) broad across the middle of the lobes, and the compressed body below the lobes 4-5 lines (8-10 mm.) broad and 2½-3 lines (5-6 mm.) thick; lobes erect and incurved, their backs not in a line with the body, compressed, 3-4 lines (6-8 mm.) long, 2-3 lines (4-6 mm.) broad, obtusely rounded at the apex and rounded on the inner face and on the back; from being covered with microscopic points, surface smooth and velvety to the touch, not shining, light green, faintly marked on the body and along the margins of the notch but not on the lobes with dots of darker green, with the usual darker pellucid patch under the notch, or perhaps the top of the lobes may sometimes be tinged with red on the keel-line. Flowers not seen but

from the evidence of the capsules the ovary appears to have been exerted and the calyx-tube microscopically puberulous. Capsule when closed 2 lines (4 mm.) in diameter, obconic, flat on the top with a central conical point, and with five valves, otherwise as for the genus.

Little Namaqualand, MAUGHAN BROWN, 1046.

Although the surface is velvety to the touch, it is not easy to detect with the ordinary low-power pocket-lens the microscopic points that produce this surface as they are only 1/300 of an inch in length.

FIG. 5. *Conophytum apiculatum*, N. E. Br.

Plant stemless, increasing rapidly, as the growths usually divide into two new ones after flowering. Growths two-lobed at the top, which is much broader than the body, 15-18 lines (3-4 cm.) high, 7-9 lines (14-18 mm.) broad across the middle of the lobes and the compressed cylindric body below the lobes about 5 lines (1 cm.) broad and 3-4 lines (6-8 mm.) thick; lobes diverging, compressed, 3½-5 lines (7-10 mm.) long, 3-4 lines (6-8 mm.) broad, flat on the inner face and with a small upturned point at the apex, behind which the top of the lobe has a slight concave notch and is slightly keeled over the top; surface smooth and glabrous, uniformly grass-green, without dots, but sometimes with a reddish-brown keel-line on the top of the lobes, and with the usual darker pellucid patch under the notch. The sheathing skins dull brown. Flowers not seen, but from the position of the capsule the ovary appears to have been included in the body of the growth. Capsule 2½ lines (5 mm.) in diameter, 5-angled, flat on the top with the center slightly elevated and with five valves.

Little Namaqualand, MAUGHAN BROWN, 1050.

FIG. 6. *Conophytum simplum*, N. E. Br.

Growths with an elongated subcylindric body and a compressed and two-lobed top, about 1¼ inch (4.5 cm.) high (perhaps sometimes less, as a capsule by the side of a growth indicated that the growth that produces it would not have been more than 1¼ (3 cm.) long, and 5-6 lines (10-12 mm.) thick in the body; lobes erect, 3 lines (6 mm.) long and about as broad, separated by a narrow notch, rounded on the inner face and obtusely rounded at the top and the keel also rounded; surface slightly velvety to the touch from being covered with microscopic points 1/1500 to 1/1000 of an inch long, green, not dotted. Flowers not seen, but ovary and capsule included. Capsule 2 lines (4 mm.) in diameter, obconic, flat on the top with a very short central point, 5-angled and with five valves.

Little Namaqualand, MAUGHAN BROWN, 1039.

FIG. 7. *Conophytum gracile*, N. E. Br.

Plant forming branching stems about ¼ inch (6-7 mm.) thick, clothed with old sheaths at short intervals, brown. Growths solitary on each branch and apparently not often dividing after flowering, 10-12 lines (20-25 mm.) long, 4-4½ lines (8-9 mm.) broad across the compressed lobes, and the cylindric body about 3 lines (6 mm.) thick; lobes 2-2½ lines (4-5 mm.) long and about the same in breadth, usually obliquely set and rounded on the back and the top part of the inner face and in side view rounded on the top; surface smooth, glabrous, but at the same time slightly hard to the touch from the surface cells projecting about 1/1500 of an inch as microscopic papillae, light green, faintly dotted with darker green on the body but not on the lobes. Flowers not seen, but ovary and capsule included in the body of the growth. Capsule two lines in diameter, obconic, flat on the top with a slight central point and with five angles and valves.

Little Namaqualand, MAUGHAN BROWN, 1052.

This distinct plant is one of the stem forming species, with the old sheaths on the younger portion of the branches at intervals of 2-6 lines (4-12 mm.) apart. I have unfortunately made my drawing (Fig. 7) of this plant rather too stout.

Fig. 8. *Conophytum recisum*, N. E. Br.

Stemless. Growths 2-lobed at the top, 7-10 lines (14-20 mm.) high, $3\frac{1}{2}$ -4 lines (7-8 mm.) broad across the lobes, narrowing downwards and about three lines thick; lobes compressed, 2-2½ lines (4-5 mm.) long, flat and acute on the inner face with sharp edges, keeled over the top; surface smooth to the touch but found to have microscopic points upon it, 1/1500 to 1/700 of an inch in length, rather light green with the keel and edges of the lobes dull purplish and sometimes the tips of the lobes are also suffused with the same color, not dotted. Flowers and fruit not seen.

Little Namaqualand, MAUGHAN BROWN, 1038.

This is a very neat and attractive little species.

Fig. 9. *Conophytum tumidum*, N. E. Br.

Stemless. Growths deeply 2-lobed and when received about ¼ inch (3 cm.) high, but after two years cultivation have become 1¼-2 inches (4.5-5 cm.) high, 7-8 lines (14-16 mm.) broad and 6-7 lines thick in the body below the diverging lobes, and 10-13 lines across the gap from tip to tip of the lobes, which diverge widely and are 6-9 lines (12-18 mm.) long, 3-4 lines (6-8 mm.) broad and 3½-4½ lines (7-9 mm.) thick, slightly compressed, acute and flattish or slightly convex on the face, with sharp edges and sharply keeled on the back; orifice, at least at the time of flowering, with each side much swollen, like a blister and somewhat translucent; surface smooth, glabrous, green or glaucous-green, inconspicuously dotted with darker green and with a row of dots along the edges of the lobes and outlining the patch under each end of the swollen orifice, and the edges and keel of the lobes dark purplish. Calyx 6-7-lobed, with the tube and ovary-part included in the body of the growth; tube 2½ lines (5 mm.) long, membranous; lobes erect, about 2 lines (4 mm.) long and ¾ line (1.5 mm.) broad, oblong, obtuse, green. Corolla 10-11 lines in diameter, expanding in the morning and closing late in the afternoon, irrespective of sunshine, not scented; tube 4 lines long, scarcely exceeding the calyx-tube; petals in two series, 5-6 lines long, ½-¾ line (1-1.5 mm.) broad, obtuse and more or less minutely and bluntly toothed at the apex, bright, clear yellow to the base. Stamens numerous, in about four series, all but the shortest exerted from the tube of the corolla; filaments of inner stamens arising near the base of the corolla-tube, all yellow at the upper part; anthers yellow. Style ½ line (3 mm.) long, rather stout, pale greenish; stigmas 5, erect and about equaling the stamens, 3½ lines (7 mm.) long, filiform, pale yellow.

Little Namaqualand, POLE EVANS.

This is nearly allied to *C. pole evansii*, but differs in being smaller, with more widely diverging lobes and the peculiar blister-like lips of the orifice.

Fig. 10. *Conophytum simile*, N. E. Br.

Stemless. Growths compressed-heart-shaped, two-lobed at the top, 6-10 lines (12-20 mm.) high, 6-9 lines (12-18 mm.) broad and 4½-6 lines (9-12 mm.) thick; lobes 2-3 lines (4-6 mm.) long, separated by a V-shaped notch, flat on the lower two-thirds of the inner face, with blunt edges, rounded at the top in side view and very obtusely keeled over the top; surface smooth, glabrous, of a slightly glaucous-green or

greyish green, sprinkled all over with darker green dots. Flowers and fruit unknown.

Little Namaqualand; in the Richtersveld, PILLANS, 5688.

This would appear to be very similar in form and size to *C. cordatum*, Schick and Tischer, which I have not seen. But that species is described as being without dots and as having a "papillous" surface, i. e. covered with microscopic points, which is not the case in *C. simile*.

Fig. 11. *Conophytum dennisii*, N. E. Br.

Growths 10-12 lines (20-25 mm.) high, 9-10 lines (18-20 mm.) broad and about 6 lines (12 mm.) thick, obcordate in side view and the upper half as if pinched between the finger and thumb into an acute ridge; lobes about 2 lines (4 mm.) long, very rounded at the top in side view, with the inner face flat at the notch, acutely keeled over the top; surface nearly smooth to the touch, glaucous-green, dotted all over with darker green and with a dark reddish line along the keel. Flowers unknown.

Origin unknown, but believed to have come from Little Namaqualand.

The above description and figure is made from a plant cultivated by Mr. Dennis O'Donoghue of Seven Kings, after whom I have named it.

Fig. 12. *Conophytum plenum*, N. E. Br.

Stemless. Growths frequently dividing after flowering, mostly oblong-obovoid, 2-lobed and compressed at the top, 5-14 (1-3 cm.) long, 4-6 lines (8-12 mm.) broad and about as thick when not dividing; lobes 1-3 lines long with a V-shaped notch between them, flat on the inner face, the top rounded into an obtuse apex and bluntly keeled; surface smooth, glabrous, green, sprinkled all over with rather indistinct darker green dots, and the keel and edges of the lobes marked with rows of dots that are probably reddish or purplish when fully exposed to the sun. Flowers not seen, but ovary and fruit included in the body of the growth. Capsule about 2 lines in diameter, obconic, flat on the top with a minute central point.

Little Namaqualand, MAUGHAN BROWN, 1052 B.

Fig. 13. *Conophytum quaeisium*, N. E. Br.

Stemless. Growths viewed from above ellipsoid, a little broader than thick, keeled over the top and with a notch about 1 line (2 mm.) deep; they are about 5-7 lines (10-12 mm.) high, 5-7 lines (10-15 mm.) broad and 4-6 lines (8-12 mm.) thick; surface smooth, glabrous, light greyish or somewhat glaucous-green with some scattered dots of darker green that are sometimes inconspicuous or absent and often with a row of dots along the keel. Flowers and fruit not seen.

Little Namaqualand; Jackals Mountains, PEARSON, SCHLECHTER.

Although this plant was introduced in 1911, I have never seen its flowers. I described it about ten years ago but it has not hitherto been figured.

Fig. 14. *C. exiguum*, N. E. Br.

Stemless. Growths small, compressed and somewhat cuneately obcordate in side view, notched at the top, 4-5 lines (8-10 mm.) long, 3-4 lines (6-8 mm.) broad and 2-3 lines (4-6 mm.) thick, with the notch sometimes scarcely evident at others, ½-¾ line (1-1.5 mm.) deep, with flat faces and the very short lobes on each side of it rounded at the top in side view and with obtuse keels; surface smooth, uniformly light green, not at all dotted. Flowers not seen, but ovary and capsule included in the body of the growth. Capsule ½ line (3 mm.) in diameter, 5-angled and with 5 valves.

Little Namaqualand, MAUGHAN BROWN, 1054.

This is one of the smallest species of this section.

Its light green color when the old skins are thrown off or burst is quite pleasing.

FIG. 15. *Conophytum auctum*, N. E. Br.

Stemless. Growths small, usually more or less compressed, with a small notch at the subtruncate or broadly rounded top as seen sideways, 6-10 (12-21 mm.) long, $4\frac{1}{2}$ - $5\frac{1}{2}$ lines (9-11 mm.) broad and $3\frac{1}{2}$ - $4\frac{1}{2}$ lines (7-9 mm.) thick; surface smooth, slightly shining, uniformly green, not dotted. Flowers not seen, but ovary and capsule included in the body of the growth. Capsule 2 lines (4 mm.) in diameter, obconic, flat at the top with a small central point, 5-angled and with five valves.

Little Namaqualand, MAUGHAN BROWN, 1055.

FIG. 16. *Conophytum springbokense*, N. E. Br.

Stemless. Growths two-lobed at the top, not dividing freely, when received about $\frac{3}{4}$ -1 inch (2-2.5 cm.) high, but after three years cultivation had become $1\frac{1}{2}$ -2 inches (3-4 cm.) high, 8-9 lines (16-18 mm.) broad across the lobes and 6-7 lines (12-15 mm.) thick in the cylindrical body; lobes 4-7 lines (8-15 mm.) long, their tips separated by a notch about 3 lines broad, compressed and sharply keeled, flat and acute on the inner face, with sharp edges, and in side view rounded into the apex which is often very slightly upturned; surface smooth, glabrous, greyish green, dotted all over with darker green and the keel-line over the lobes purplish in full sunshine, while the usual darker patch under the notch is elongated and very distinctly pellucid in this species. Flowers and fruit not seen.

Little Namaqualand; Springbok, MAUGHAN BROWN, Muir 4163.

FIG. 17. *Conophytum pole evansii*, N. E. Br.

Stemless. Growths deeply two-lobed and when received about $1\frac{1}{2}$ inch (4 cm.) high, but after two years cultivation has become 2-2 $\frac{1}{2}$ inches (5-6.5 cm.) high, and 8-10 lines (17-21 mm.) broad and 6-10 lines (12-21 mm.) thick in the body below the lobes, which diverge widely and are 7-10 lines (15-21 mm.) long, 4-5 lines (8-10 mm.) broad and $4\frac{1}{2}$ -6 $\frac{1}{2}$ lines (9-13 mm.) thick, slightly compressed, flat or slightly convex and acute on the face, with sharp edges, keeled on the back; surface smooth, glabrous, uniformly green or slightly glaucous-green, with edges and keel of the lobes dark reddish at the apex, entirely without dots except along the edges of the lobes, but the dark brown dead sheaths are conspicuously marked with large blackish dots; orifice not raised into blister-like lips at the time of flowering. Calyx 6-lobed, with the ovary-part included in the body of the growth, green, with whitish edges to the lobes; tube about 2 lines (4 mm.) long; lobes erect, $2\frac{1}{2}$ -3 lines (5-6 mm.) long, oblong, obtuse. Corolla funnel-shaped, about 14 lines (3 cm.) in diameter, open in daytime, closing between four and five p.m., not scented; tube about 7 lines (15 mm.) long, yellow; petals in about three series, ascending—spreading with recurved tips, 7-8 lines (15-17 mm.) long, $\frac{1}{2}$ -1 line (1-2 mm.) broad, linear, obtuse or slightly notched at the apex, clear yellow to the base, shining. Stamens in about four series, all close together at the mouth of the corolla-tube, and shorter than the stigmas, the lowest series arising at the bottom of the corolla tube; filaments and anthers yellow. Style 3 lines pale yellow. Stigmas 6, exceeding the stamens and 6-7 lines long, filiform, yellow. Top of the ovary conical, green.

Little Namaqualand, POLE EVANS, 5.

This fine species was sent to me by Dr. I. B. Pole Evans two years ago together with *C. tumidum* (FIG.

9), from which it differs by its larger size, the black dotted sheaths, by the lips of the orifice not being swollen, by the less exerted stamens and longer stigmas.

FIG. 18. *Conophytum editbae*, N. E. Br.

Growths stemless and usually solitary and apparently not forming clumps, 6-9 lines (12-18 mm.) long, 6-11 lines (12-23 mm.) broad and $5\frac{1}{2}$ -10 lines (11-21 mm.) thick, somewhat globose flattened on the top, which is divided into two very short lobes that are slightly convex on the top by a transverse shallow fissure having a deeper depression at each end of the orifice; surface smooth and glabrous, of a cheerful pale green, with a patch varying in size of densely crowded darker green dots on the top of each lobe and apparently forming a somewhat window-like structure, not otherwise dotted or marked. Flowers not seen, but ovary and capsule included in the body of the plant. Capsule 2-2 $\frac{1}{2}$ lines (4-5 mm.) in diameter, obconic, 4-angled, with the center of the top rising into a broad cone, and with four valves; structure as for the genus. Van Rhynsdorp Division, MAUGHAN BROWN, 1030.

This is a remarkable species and unlike any other I have seen. The shape of the plant, with the fissure across its top dividing it into two lobes with flattened or slightly convex lobes, and its solitary habit give it somewhat the appearance of a *Lithops*, but the texture and pale green color of its skin is quite different from that of any *Lithops*, while its fruit is identical with that of *Conophytum* and the plant evidently belongs to the *Fenestrata* section.

When the resting period of this plant is over and its new growth bursts the dry brown skin that enclosed it, this skin is cast off entirely in the form of a cap with split sides, so that there are not sheath-like remains at the base of this species. And as this cap-like skin usually has the ripe capsule adhering to its inner surface and is blown away by the wind, this effects a dispersal of its seeds.

Belgian Cactus Magazine

The first issue of the Belgian Cactus Society magazine made its bow to the Cactus and Succulent loving people of that country on March first.

Here is the greatest measure of optimism ever brought to my attention. Eighty people, paying an equivalent of 70c per year in dues, have, with this meager amount, produced an official, regularly published magazine along the lines of our JOURNAL. The courageous secretary, G. Van de Weghe, writes: "We have only small means and are not allowed to be extravagant, but it will be, what it will be."

The magazine will be published in the Flemish language, and as a member of the Belgian Cactus Society I will accept the applications for membership from the United States, Mexico and Canada. While the dues are but 70c, if you will enclose a \$1.00 bill in an envelope and mail to me, I will gladly look after the details of your membership, and the Belgian Society will get the full \$1.00 you send me. Do not hesitate because you are unable to read it. I can not either, yet I would not be without it.

G. A. FRICK, Librarian,
Cactus and Succulent Society of America,
1800 Marengo St., Los Angeles, Calif.

Space for Cactus Garden

At Abbey San Encino, 6162 Pasadena Ave., Los Angeles, with or without a studio. An ideal location for a private collection or a commercial garden. Address Clyde Browne at above address.



Rhipsalis penduliflora

Again William E. Hess of San Antonio, Texas, has proven his superiority as an expert grafter of Cacti. The accompanying photograph of *Rhipsalis penduliflora* in flower, grafted on *Pereskia aculeata*, which is the favorite host plant of the *Pereskia* group, shows the splendid results of this union.

The vigorous growth shown on *Rhipsalis penduliflora* is very unusual, and is somewhat similar to the same combination shown at the First Cactus and Succulent Show at Pasadena by Mr. Hess, which won first prize in its class.



Lophocereus schottii. The accepted form of this species. Photograph taken near Rancho Refugio, northwest of La Paz, Baja California.



Close view of tallest branch of plant shown on left.



Lophocereus australis, K. Brandegee. Photograph taken at Todos Santos, Baja California.

THE GENUS LOPHOCEREUS

E. M. BAXTER

There have been three (and possibly more) species of this genus described in botanic journals. Britton and Rose in their "Cactaceae" say that they consider the three named species as racial forms of a single species and have kept the oldest name, *schottii*, for their designation.

Engelmann first described *Lophocereus schottii* as *Cereus schottii*. Britton and Rose gave the genus its new name in 1909. Orcutt named *L. sargentianus*, and Mrs. Brandegee gave the name to *L. australis*.

Lophocereus schottii, as we learned in Mr. Barrett's article in the first issue of the JOURNAL, grows as far north as a quarter mile past the international boundary in Arizona. It grows as far south as La Paz in Baja California where it is replaced by a form that differs widely from it.

This species (*schottii*) is well illustrated in the accompanying photograph. It branches from the ground into as many as thirty stems. These have four to six ribs separated by broad intervals, and grow ordinarily about six feet high. The areoles are spaced one inch apart and each bears a cluster of spines, six in number with one or two central spines. They are all the same size, $\frac{1}{4}$ inch long, swollen at the base, gray in color. The stems are a dull light green color. They contain a tough woody core surrounded by a very glutinous body, with a tough, smooth skin covering

the whole. The plant is easy to handle because of the wide space between ribs.

The photograph of the stem tip is a close-up of the tallest stem shown in the picture of the whole plant. It shows the entirely different nature of the fruiting stem that runs the height of the plant up to twice its normal size. It is this odd feature of greatly increased number of spines at the areole and their equally greatly increased length that is the distinguishing characteristic of the genus. The fact that it has two or more flowers from an areole classes it with the genus *Myrtillocactus* separate from all other genera, but the above mentioned is the differentiating character between those two.

This photograph also shows the fruit, not yet matured but full grown. They are berries $\frac{1}{2}$ inch in diameter. The ripe fruit is used as an emetic by the natives, who say it is not edible.

A few miles west of La Paz we saw a different growth of *Lophocereus*. It was larger by fifty per cent than any plant of *L. schottii* that we had seen, and appeared to have a greater number of ribs. From the growth of the flowering branches it was evidently a *Lophocereus*. Unfortunately we did not stop to inspect it more closely, intending to do this on our return trip. Returning, we passed the location during the night and so missed it entirely.

From the meager description available, this was the plant named *Lophocereus sargentianus* by Mr. Orcutt, although the locality from which the plant was first collected is more than three hundred miles to the north. Another collector claims to have found the plant and it may prove to be a new species.

This variety grows as a buffer between the two more common varieties (or species) found in the peninsula. Where it leaves off the slender, taller form of *Lophocereus australis* comes into evidence.

Lophocereus australis does not graduate slowly into the accepted form of *Lophocereus schottii*. It has between it and this latter the heavy, much larger form mentioned as *L. sargentianus*, and differs this way from another genus with two similar forms, *Lemaireocereus thurberi*, which merges slowly from one to the other.

Lophocereus australis is so named because it is found at the southern end of the peninsula. It grows with a very definite trunk varying from one foot to five feet in height. Its branches are always only half the circumference of *Lophocereus schottii*, and range from a similar number of ribs (4-6) to as high as eight and nine. It grows to a height of twenty-five feet and is much more numerous branched than either of the other two species. It also has the tendency, not found in these others, to branch and divide at any place along its length.

L. australis occupies the lower end of the State exclusively. It does not have either of the other forms in its territory, and does not venture into theirs. In the region of Cape San Lucas it is the most noticeable plant of the vegetable population, outnumbering even the giant *Pachycereus*. One feature that I noticed in this section of its distribution was that its ribs were constant in number—six, as in *Lophocereus schottii*. At Todos Santos the number varied between seven and eight, with an occasional nine count. The photograph was taken about two miles north of Todos Santos.

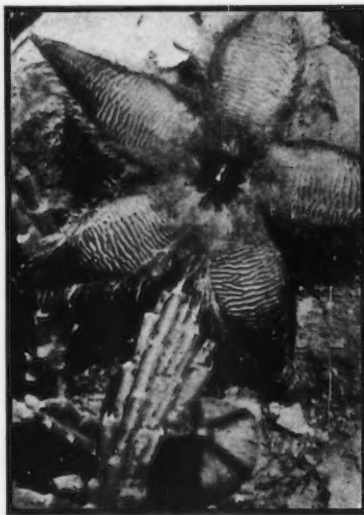
The growth of the stems is slow, measuring about a foot a season in a mature plant. After reaching a height of six feet there is an indefinite pause; then a sudden rapid growth, accelerating until it becomes so tall (and incidentally, weak, because of the rapid growth) that it falls over to the ground and either breaks off or constricts at some point sufficiently to cause death at that point. The fallen tip will send out roots, if conditions are favorable, and form a new plant which repeats the process. Most plants of mature age have such great numbers of these fallen-over stems that they spoil the beautiful symmetry found in less mature specimens.

Stapelia flavirostris, N. E. Br.

By JAMES WEST

This *Stapelia* belongs to the large section *Stapletonia* which includes plants having flowers without any ring, with inner corona-segments prolonged anteriorly into a spur, undivided ligulae, and stems usually hairy. In this section are also found such better-known species as *S. grandiflora*, *S. gigantea* and *S. hirsuta*.

S. flavirostris, N. E. Br. (Latin *flavus*=yellow, *rostrum*=beak, referring to the yellow tips of the posterior appendages of the inner corona) is closely related to *S. grandiflora*, differing from it chiefly in the more pronounced cross-stripping of the petals, a lesser degree of hairiness at the center of the flower and stems with teeth more closely set.



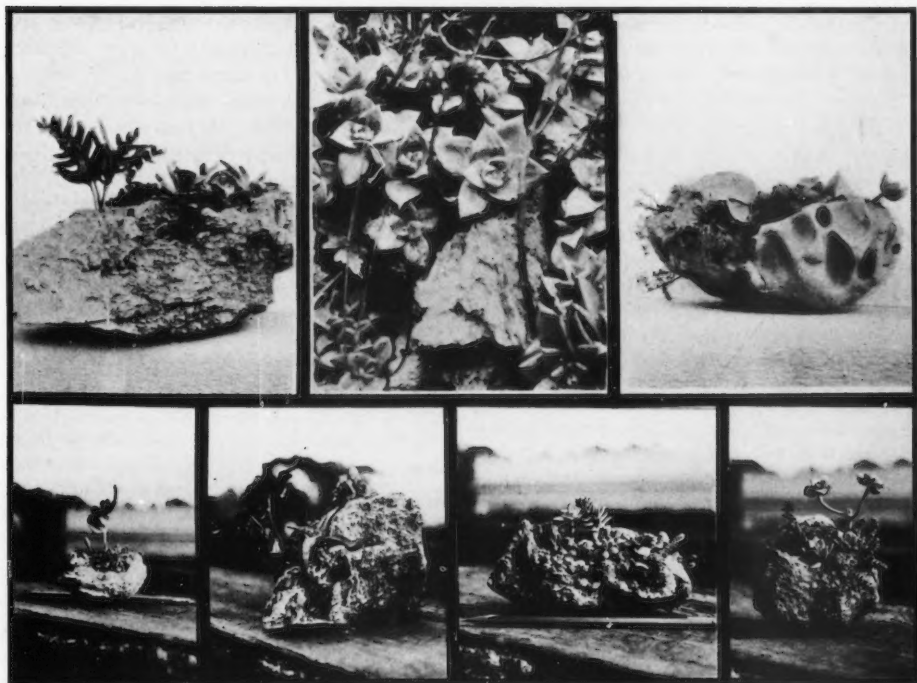
Stapelia flavirostris, N. E. Br.

Copy of a photograph by H. Lang,
American Museum of Natural History.

The flowers are about 6½ inches in diameter, dull purple, conspicuously overlaid in the lower half of the petals with pale yellow transverse stripes, the upper part being uniformly dull purple and naked. At the base are long soft hairs; the margins also being fringed with red or white hairs.

For a *Stapelia* the species has a wide distribution in South Africa, being found in the interior southeastern Divisions of the Cape Province, but also in Little Namaqualand and in West Griqualand.

Our illustration was taken at Abraham's Kraal, in the garden of our contributor, Mrs. D. van der Bijl.



LOWER ROW—Paper Weight Gardens.
UPPER LEFT—First Paper Weight Garden.

UPPER CENTER—*Dudleya caespitosa*.
UPPER RIGHT—Mussle Bored Rock.

THOSE PAPER-WEIGHT GARDENS

By H. WALTON CLARK*

At first I regarded them as a new invention in horticulture all my own, and was accordingly swelled with pride. Later on, although I have never seen any made by anyone else who had not first seen mine, I was not sure, partly because their development was so gradual and so natural, partly because one of the chief themes of my contemplations is the Principle of Continuity, which involves, among several others of its startling corollaries, the implication that nothing has any beginning or any end. Their invention, if so it may be called, can hardly be looked upon as a definite event, and they cannot be assigned any particular birthday.

The most important factor in their development was the fact that I often haunted the pres-

ence of that wonderful plant-lover, gardener, botanist, and rare entertainer, Charley Abraham, whose departure has left many a plant and garden-lover desolate, and watched him making those adorable bowl gardens for which among many other things he was so famous. It used to be a saying among the garden-minded of the region that "If you don't know Charley Abraham you don't know San Francisco," and to be with him was to . . .

"Watch

The master work, and catch
Hints of the proper craft; tricks of the tool's true
play."

My first step toward the paper-weight garden

*Curator of Fishes, Cal. Acad. of Sciences, San Francisco.

was indeed a bowl garden, not so varied as those of Charley's who assembled in quaint bowls all forms, colors and types of succulents, using rather sparingly those feline and scratchy cacti which are now so much the rage, but using freely aloes and sedums or stonecrops and mesembryanthemums, or ice-plants, liveforevers, hens-and-chickens and the like.

I had always admired, too, those quaint miniature landscapes with dwarf trees and other accessories built within frames, that were to be seen in the Japanese windows; only the frame always seemed to be something of an impertinence.

Once on a Sunday walk among the cliffs that border the Pacific I was struck by the beauty of some of the wild Dudleyas, bright pink and red in hue, like opening rosebuds sitting directly on the sand—popping out of it apparently, much as the grains of popcorn I used to bury in the hot ashes blossomed suddenly out of that. There were two types of the Dudleyas, a bright green and a grey, and each, under proper conditions developed into a sort of red or pink or purplish rosette. A number of these I collected, put into a bowl filled with the sand in which they naturally grew, and had an attractive bowl garden.

But in my rambles among the hills farther back from the ocean I had noticed that the Dudleyas, along with other plants, grew in minute crevices or pits of rock with almost no soil and so endured through our rainless summers. One of these rock plants was a sedum, *Sedum spatulifolium*, which grew in great patches over almost bare rock on steep slopes near the summits of the hills, and while the plants in the deeper and moister pits where they were in shadow remained more or less green, those more exposed became yellow or red, giving, even in the distance, a vivid coloring to the areas where they grew. In a neighboring county I found later a *Sedum* quite similar to the one just mentioned but covered with a grey "bloom" or powder and an entirely different attractive Dudleya. And there was a tough leathery fern (*Polypodium scolieri*), which not only grew in the crevices of the rocks, but also climbed trees, becoming a sort of epiphyte.

Again I stumbled across a rock almost small enough to be called a dornick (in my country the word "dornick" was usually applied to a stone that could be used as a missile) but deeply pitted enough to hold a few plants. I put in a spoonful of soil, planted some Dudleyas, Sedums and ferns, and had the first paper-weight garden.

Then began an active search for similar rocks

with the gradual establishment of what might be called a standard of perfection like that used in another field of endeavor by the men who haunt chicken shows. The ideal rock is composed of the same material as that among which the plants naturally grow, more or less plane upon the surface upon which it is to rest, rough and jagged and pitted above, and all its faces aged. That is, with no recent lines of fracture, and the rock if possible, grey with the lichens of a hundred years. Such rocks, from their rarity, might indeed be called precious stones, and to find one approaching perfection is an event; and, hedged about with such limitations, paper-weight gardens would always be rare and precious.

An important condition to be imposed on the rock used for a paper-weight garden is that it shall be found, not made or artificially modified. It is easy enough to find jagged and pitted rock surfaces on great masses of rock and there might be a temptation to knock them off; but no one has any business, under any provocation or temptation whatever, to contribute to the delinquency of landscapes with a sledge-hammer; for it may be said of our garden rock as it was said of the ancient altar stone, "If thou liftest up a tool against it, thou hast polluted it."

Certain pitted rocks to be found in volcanic regions are admirable, but the easily worked tufa that aquarists use to make into odd shapes for their aquariums should be ruled out; for, while natural in a sense, it is too easily shaped artificially to suit the purpose, except as an article of commerce.

Our taxidermist, who is an expert counterfeiter of everything except money, can make an exact duplicate of any bit of rock you can show him, even by putting on a century's growth of lichens in a jiffy. These creations, which we facetiously call shamrock, he, or anyone else who could do as well, might be entitled to use, as a concession to their skill. They would at least be preferable to tufa, which any slouch can handle.

Then there are the rocks to be found along certain stretches of beach; those excavated by sea-urchins and those drilled by the rock-boring mussel, *Pholas*.

Hardly had I got my making of paper-weight gardens under way when I began to ardently desire some of those hollow crystal-lined rocks known to geologists as geodes, which I was familiar with during my college days. A fortunate circumstance led me back to those old haunts and I brought back with me a half bushel of them.

For paper-weight gardens, next to the old lichen native rocks I first used, they are simply supreme.

A friend who had seen my little gardens and was unable to find a suitable rock happened to come across a twig of manzanita with that gnarly base peculiar to the species, and had me plant some of the rock plants in the pitted surface of the base. The discovery of this use was no less, on her part, than a stroke of genius; for the old dead manzanita bases, especially when charred black by brush fires or overgrown with lichens, bear a striking resemblance to a bit of jagged rock. The rock plants thrive in them admirably, and there is a possibility of attaining all sorts of charming artistic effects with them. Unlike the gardens made in actual rock there is something sort of souvenirish about them, and to one with business instincts well developed, they would offer the best prospects for commercialization.

Another, who had seen the paper-weight gardens had been unable to find a suitable rock—indeed may not have looked for it, but in rambling about the site of the home of her childhood had stumbled across an irregular chunk of mortar admirably suited to the purpose. Now, so far as she was concerned, this happened to be found, not made, and the maker had not consciously intended it for this end, its fitness being merely a happy chance.

And somehow, nothing could have been more divinely fit. For after a good many deliberate and unsuccessful rock-hunts, and a number of happy discoveries, there appears another limiting condition. To produce the very happiest results these rocks should be not only found, not made, but also found, not sought; and that every rock devoted to this service should be the memorial of some happy event, or consecrated by the memory of a surprise.

And thus, whether one consciously so arranges it or not, the choicest of his gardens will be the memorials of some happy event. Much as that delightful "Aunt Jane of Old Kentucky" could give the history of every piece of the patchwork quilt, or more appropriately still, in a lodge-like home by the side of a lovely lake, they wrought into the stones of the fireplace, from the big Indian hammer that formed the keystone of the arch to the flat flagstone that is a part of the hearth, the family traditions and memories of their wanderings and their rest. To the family itself, or to one who had been initiated into that delightful family circle by listening beside the cheerful flickering flames on long evenings to those memories and traditions, any sum for which that house could be bought or sold would

be touched by the taint of simony.¹

So, among my most cherished paper weight gardens is one reminding me of a tramp back of Mount Davidson one Sunday morning, another I found on the steep slopes of Mount Tamalpais when we walked over to see the mountain play, a bit of pitted travertine I picked up on the desert when we were chasing desert lizards over the sand, one of a pleasant sojourn near Calistoga to whose natural charms Stevenson has added a touch of fame, others remind me of my college days and pleasant rambles over the country about Griffly Creek and Huckleberry Hill, and a few rocks that were brought me by friends.

Now, as to plants; some incidental mention has already been made to the native ones used. By the use of those introduced by gardeners, the possibility of variation of the paper-weight gardens is immensely extended.

In all parts of the world having long dry seasons, the plant life has adapted itself in various ways. All plants living in dry locations and particularly adapted to such locations are known botanically or ecologically as *xerophytes*. The fleshy leaved with thick skins are known as *succulents*. There has lately developed among gardeners an intense interest in succulents which has found expression in a CACTUS AND SUCCULENT SOCIETY, with regular officers, admission fees, annual dues, and a JOURNAL. An enormous number of succulents have been or are being introduced, among them the sedums, commonly known as "stone crops," the saxifrages, which means "rock-breakers" because they are naturally found in rock crevices as if they had broken the rocks, and the mesembryanthemums or "ice-plants" many of which are native to South Africa. Not all of these will succeed in the paper-weight garden but all are worth trying. Some of the dwarf or dwarfish evergreens are also worth trying for the larger gardens.

For tree-like effects, nothing is better or more

¹Without straying too far afield, it may be permissible to add in a footnote a few of those many reminiscences heard before that cheerful and hospitable hearth. The big stone axe was found at the foot of the hill back of the lodge. On the hearth was a flat slab upon which the mother made mudpies in her childhood, and there were stones from the old spring from which she drank when, still under the guardianship of the forests, cold clear water bubbled up where now is arid ground. And there were rocks from the ancestral home up in the Haw patch country; a home whose hospitable threshold had often been crossed and whose cheerful hearth fire had often stayed the wandering feet of a gently saint, now almost traditional, whose ministrations made the wilderness instead of the desert, blossom like the rose, and whose plantings flourished as the apple trees among the trees of the wood. It is one of the regards of those who have harbored saints to cherish traditions, and I heard a good deal about him, how he would never sleep in a bed but on the floor in front of the fireplace and used the bag of apple seeds of this pillow; and how, struck by the beauty of a little daughter of the house, he wished her set aside to become his bride, her raiment never to be fastened by factory made pins, but by wild thorns which he called the "Lord's pins."

charming than *Sempervivum haworthii*, a plant which in rich soil grows rank and almost ugly, but with scanty poor soil and on rocks remains dwarf, the edges of the thick fleshy leaves delicately tinted with pink. *Sedum dendroideum* captured young and dwarfed, is also effective.

For undergrowth or "ground cover" or better, rock cover, and to fit into the smaller shallower depressions, the little gray *Sedum dasyphyllum* is supreme. *Sedum moranense* of Mexico, which turns pinkish or red in the sun, *Sedum acre* or *Sedum album* which remain bright green, work in beautifully, and one can even work in the mosses he finds growing on rocks or even on roofs; there is a little pearl-gray one that works in with admirable effect.

With the rocks, a collection of plants, a little proper soil, a little water and a medicine dropper and perhaps a pair of forceps and spoon, and if one cares, a few bright pebbles at hand, with most of the sorts of rocks mentioned, making the gardens is a rather simple affair. With the spoon one puts in what we used to call a "little smidgin" of soil and moisten it slightly, then the bits of plants, which usually root readily are inserted, the tall ones and the short ones in their place, the different hues of foliage properly blended, with the little gray sedum and bits of pearl-gray and green moss in the smallest niches. All bits of soil that show are concealed, and the plants held down by little pebbles, and the thing is complete. One may sort his pebbles according to the color of the plant, placing a bluish or greenish pebble near a reddish plant or a reddish pebble by a greener plant; but little white pebbles are always neat and in order like the white-washed dornicks with which George Ade decorates his Hoosier homesteads.

With most of the rocks described the making of the gardens is a simple matter; but those drilled by the sea-urchins or by the boring mussels often present problems requiring more care and skill. The cavities drilled by the sea-urchins are more or less a segment of a sphere, and are usually too shallow to use very satisfactorily though they present area enough. One of the daintiest of the gardens I made, which, for a story too long to tell here I named "The forgotten garden" was of this sort. I placed a rosette of *Sedum spathulifolium* in the middle, and having happened to find the silvery seedlings of another wild sedum just coming up, and those

little fat seedlings of *Dudleya* which are red like a coleus, I planted them around in circles like in a posy bed, and placed in position the appropriate pebbles.

But it is the *Pholas*-bored rocks that are the most tantalizing. One needs choose them with care, for on some bits of coast the mussel uses soft rocks that crumble rather too readily. One can however, occasionally find a hard resistant rock and I prefer those overgrown with variously colored patches of bryozoans which I like to think of as the lichens of the sea. In these rocks the burrows are generally deep enough, indeed many are too deep, entirely perforating the rock. A good *Pholas*-drilled rock pitted with burrows, cavities and depressions or dimples of every imaginable size and shape is, to the paper-weight gardener, one of the most tantalizing things on earth, as, to a literary artist, an unfinished manuscript must be, as, indeed manuscripts always are; and some of these gardens I had no sooner given away than I began immediately and intensely wanting them back, not indeed as an "Indian giver" but as I imagine a literary artist must immediately and intensely desire back a manuscript he had sent to the printer or as one would wish back a growing child committed to the earth.

For, until enough sorts of plants have been found to plant in its various cavities, the making of a *Pholas*-rock garden is somewhat like the supreme art of literature, which is preeminent above every other art that comes to mind by virtue of its potential sempercrescence, which is almost the same thing as saying its eternal youth. For with the painter comes the time when the canvas will hold no more pigment, and to the sculptor when the statue, however unsatisfactory, is finished, and another stroke of the chisel that has made must mar; but the art of literature is, as we used to say of certain structures in botany, of indeterminate growth. For there always remains, in the living and everchanging sea of language some more fitting word or happier phrase which the deep dredge of labor or meditation will bring up.

So when at last the paper-weight garden is done, or left undone and wistful, as the case may be, there is a feature about it that makes it the most personal and intimate of gifts. It has no means of conveyance except by the hand of its giver or that of his ambassador.

Let's Show What We Are Doing for the Conservation of Cactus at Our Third Annual Show

By NED LAWRENCE

One day about twenty years ago I was walking far out in that region where Hollywood was in the making, and among other evidences of progress I came upon a gang of Japanese destroying a row of plants on an estate soon to be built upon. They had cut and haggled the roots of a fine specimen of *Agave*, and hacked its leaves until it was a sorry sight. I picked up the poor, bruised and mutilated *Agave* and brought it home. I trimmed it back, seared its wounds, planted it, and tried to nurse it back to life. It was a matter of years before that abused plant could regain its health, renew its growth and become a decoration to my garden.

And there she stands today, and I am well repaid for my care. Visitors admire it, many want to buy it, and it happens to be one that is unusual if not rare. From it I have propagated some children and grandchildren, so that the species will not become extinct.

But what if I had not taken this pains? Surely there would have been danger of extinction. And I have done only what hundreds of other members of our society have done, are doing and are bound to keep on doing, to conserve the cactus indigenous to this part of the world, and to prevent its utter and ruthless extirpation in the name of progress, and before the steam shovels of road-builders and edifice constructors.

All of which is preliminary to what I wish to urge upon all members of this Cactus and Succulent Society of America, and that is that we all turn to and get ready to make the third Annual Cactus Show of our society a magnificent exhibition. We have got the plants—let's show them.

The dates are Friday, Saturday and Sunday, May 22, 23 and 24.

This society showed the people of Los Angeles and vicinity such an exhibition of cacti and succulents last May as to be to them a revelation and a marvel. All preconceived, self-conceited or prejudicial opinions in derogation of these xerophytes were swept away as by a landslide.

The provincialism of those who were loth to admit that there is beauty in cactus was broadened by what they beheld. Those who came to scoff remained to laud. Those who supposed they knew it all, blushed with confusion and regretted their folly.

Now all these people who were converted at the last show are coming back to the next one—and bringing other infidels along that they may witness their humiliation. We may well expect an attendance of thousands as against hundreds heretofore.

But we must be ready. We must give as good a show—even better—than before. And it must not be left to a half dozen members of this society to make all the displays, and do the lion's share of the work.

This next exhibition should not omit any genus or species or leave unrepresented any type; and it should show as perfect specimens as possible and the nomenclature should be above reproach.

The tendency of the show committee at this time will be to encourage the small exhibitor, of one family or one individual specimen, rather than urge enormous sweepstakes entries. The prizes this time will be an honor to win, because the competition is likely to be close and many new exhibitors are expected.

What our members should hold as the goal of attain-

ment, is to exhibit as many specimens in full flower as possible, and to this end it may be well to hold back the flowering of some until show-time.

Moreover every exhibit should be made picturesque and attractive, and the plants should be so conditioned as to be at their best at show-time.

It is not too early to make up our minds what we are each going to show and to announce our determinations as to space needed, and general character of our exhibits to the Show Committee, that they may dispose, distribute, group and demarcate the locations to best advantage.

This is the first public announcement of the show. Feel free to tell your neighbors all about it and get them interested. We want first-class publicity this year.

Secretary's Notes

The February meeting was held at the Pasadena Public Library and the large number of cactus enthusiasts which filled the Lecture room to capacity were well entertained by the illustrated lecture of Dr. John Adams Comstock, Assistant Director of the Los Angeles Museum.

During the past month the Society has gained thirty-four new members. These came from twelve states, Japan, England, and, our first in South America, Buenos Aires, Argentina. Only a year ago a goal of one thousand members was a dream. Today it is a glorious reality. By the time you receive this issue of the JOURNAL we shall be on our way to the two thousand mark.

The Third Annual Show of the Cactus and Succulent Society of America is planned for Friday, Saturday and Sunday, May 22, 23 and 24. The Show committee, of which Colonel L. W. Jordan, of Bel Air, is chairman, is busily at work formulating plans. Begin now to plan your exhibit.

Authorities agree that April is the most desirable month to sow cactus seed. Mild temperatures induce free germination, and the heats of summer favor rapid growth. In the April issue of the JOURNAL Dr. Manning will give the favored methods of growing all kinds of cactus from seed, and will tell of the delight in watching the development of these 'beautiful enemies' from babyhood to maturity.

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Courtesy Southwest Magazine
Cow feeding on Opuntia near Tucson, Arizona.

THREE DAYS AFIELD IN SOUTHERN ARIZONA

By KARL O. FRICK

Leaving the Catalina Mountains, which trip was described in the August number of the Journal, we drove south to Tucson. There we visited the Carnegie Desert Laboratory and had the pleasure of meeting Dr. D. T. MacDougal and Forest Shreve, from whom we learned much about the work that institution was doing with desert plant life, and cactus in particular. One *Carnegiea gigantea* growing on the premises was harnessed, hitched and bridled to the extent that we thought the eminent gentleman must have mistaken the plant for an itinerant.

The following day we drove south for a distance of 60 miles, through a country covered with scattering growth of chaparral, towards the Mexican border where we knew the "Rainbow" (*Echinocereus rigidissimus* Rose) was to be found. No cacti of note were seen until we reached the Tumacacori mountains, where we found a live spring of water piped to a trough, and we made camp. Birds and mammals from many surrounding miles come to this spot for water, as the place hummed with life for the two nights we camped there, but not one person put in an appearance. Growing in this

vicinity were *Coryphantha aggregata*, Eng. and *Coryphantha recurvata* Br. & R., one cluster of which we found had 32 heads; also one solitary plant, and the only one found on the entire trip, of *Coryphantha robustispina* Br. & R., which was a full grown specimen, and had four seed pods held securely by the spines in the crown of the plant. These have produced about 300 seedlings in our hot house since.

Only three of the flat jointed Opuntias were found in this range of mountains: *O. macrocentra* Eng., *O. chlorotica* Big. and *O. Santa Rita* Rose. The coloring of the latter was very beautiful.

All the *Neomammillaria macdougalii* Rose, that we saw in this district would afford a spree to an entomologist, as all were infested with a very small maggot that attacked the plant at the apex and worked outward from that point until the entire surface was covered with their larvae. From the many dead plants seen of this species it is safe to say they are doomed to extinction in this range of mountains; also what specimens we did see were unusually large, one measuring 11 inches in diameter with a rise of 6 inches above the surface of the ground.

Opuntia fulgida Eng., was the only *Cylindropuntia* seen by us in this section of the country, and they seemed dwarfed after what we had been used to seeing over in Pima county where the Catalina Mountains are located.

There were many of the stellate-spined *Echinocereus fendleri* Eng., here, but the difference

season was on. One elongated specimen, we found hanging from a cliff, had assumed the shape of Sherlock Holmes' calabash pipe, with at least nine inches of the main root exposed to the weather. It, like its more fortunate kin was in flower also.

Driving from the spring to the summit of the



Echinocereus rigidissimus was found growing plentifully.

in appearance was so great that they would scarcely be taken for the same plant. The spines were very short and robust, a wide variation from those growing farther north.

Neomammillaria microcarpa Eng., were everywhere, but the most plentiful was *Echinocereus rigidissimus* Rose. It is not exaggerating to say there are millions of these; and the flowering

mountains, I was fortunate in finding a true fan shaped crest of *Coryphantha recurvata*. A short distance from the summit we came to the Montana mine, where we learned that the name of the place where we camped two days before was simply called the "Spring." The man in charge of the mining company store, seeing we had cactus on our machine, informed us that

there was a cactus in the camp that he was sure we had never seen before and after shouting "cactus" a few times, a tall, lumbering, middle aged, foreign-appearing person answered his call, and we were introduced to Peter Kactoz. The introduction cost father 50c, as Peter was out of funds.

All the *Ferocactus wislizeni*, Eng., between the mine and an old abandoned cow town called Arivaca were of a dwarfed habit, never over 15 inches high, yet they had the circumference of the largest we had seen in Arizona. At Arivaca the only store in town opened for business as soon as we entered the main street and closed

again as soon as we had made our purchase of biscuits and canned salmon, the only available food. While eating, a piece of human drift wood with a face like a movie cutthroat who claimed he was from everywhere and going anywhere, joined us in the meal. He used excellent English, and to our surprise knew most of the cactus by their botanical names; claimed to be personally acquainted with both Dr. Britton and Dr. Rose, and proposed that for \$5.00 he would show us where there was a dense growth of *Lophocereus schottii*. But he was too eager in his sales talk, and too optimistic about the number of plants he had located, for us to accept it as the truth.

Baby Cacti in the West Indies

By M. E. BROADWAY

What funny, pretty little things are seedling cactus plants. And what a time they seem to take with me in assuming their definite forms and shapes.

Today I will limit myself to six Trinidad species, the names of which are as recognized by Britton and Rose.

1. *Cactus caesus* (Wendland) Britton and Rose: The Turk's Cap or Melon cactus. My seeds germinate from a week onwards. Sown July 31, 1930, they are now (September 29, 1930) little roundish green bodies hardly visible to the naked eye, tufted at top with minute, whitish, hair-like growths. Whenever will they arrive at maturity? Twenty years or more perhaps, would not be an erroneous guess.

2. *Cephalocereus moritzianus* (Otto) Britton and Rose: Sown August, 1930, are today (Sept., 1930) six lines ($1\frac{1}{2}$ inch) tall. Lower part of seedlings smooth, flask-shaped, eight-angled at upper extremity with areoles and tiny grayish rudimentary spines already developed. Really pretty, little, curious objects. Seed-leaves still holding securely.

3. *Cephalocereus smithianus*, Britton and Rose: Apart from being of more slender build, the remarks applied to No. 2 seem to fit here also.

4. *Hylocereus lemairei* (Hooker) Britton and Rose: Seeds sown June 31 are now (Sept. 29, 1930) but six lines tall. Not much progress in three months' time. Think of the day such miniature plantlets may develop to the normal state of this climbing cactus—thirty feet long, and bearing big whitish blossoms. Where shall some of use be then? The little bodies are becoming

angular with areoles of nearly microscopic spines or whatever name one likes to give them. In some the black, smooth seed-case still adheres to one of the plump, shining, green cotyledons.

5. *Lemaireocereus griseus* (Haworth) Britton and Rose: Seeds sown on July 24 began to appear above ground within a week's time. At date (Sept. 29) they are barely four lines tall. From the beginning they were looking handsome and promising until a day's tropical rain rotted off 80 per cent of them. The one-piece flat cotyledons (I do not know how else to term them) are quite prominent, and the little plants are assuming shape by getting into four and five-angled individuals, with miniature areoles and fine whitish hairy materials. Before flowering—20 to 50 years hence?—they have to make a lot of wood growth before attaining the adult stage. That needs patience and long life to the grower.

6. *Opuntia boldingbii*, Britton and Rose: Seeds sown on May 25, 1930. Today (Sept. 29) the biggest has grown to $6\frac{3}{4}$ inches tall, and at the widest part $1\frac{1}{4}$ inches. This brings them to four months and four days of age. They are making rapid headway compared to the five referred to above. Their condition is satisfactory, clothed with tiny leaves and brownish little spines. During one night a slub bit off the top of one; today it has a new joint thrown out at right angles to the basal part.

In the McCabe Cactus Garden's illustrated catalog which came to me recently, I note on p. 9, under an article entitled "Raising Cactus from Seed" that a cutworm, snail, bird, mouse, mealy bug and scale were listed among the enemies to seedling Cacti. So far my only enemy is the deadly slug of which we have such numbers.

President's Column

WHY A HOME FOR THE SOCIETY?

"Be it ever so humble, there's no place like home," is just as true today as it was when those famous lines were written. It always has and always will be so. A cave, a skin tent, or a rude hut may have sheltered the family, yet it was home. Even so, man when organized into a group must have his home, his meeting place. The desire is inborn. The gang spirit of the boy and the club of the aristocrat are expression of this native tendency.

A home gives its owner prestige, a sense of security and a feeling of well being.

The Cactus and Succulent Society is not only desirous of these things but necessity is knocking at its door.

Two years ago when this Society was organized, the chief assets were an idea and a determination to bring that idea into fruition. The President lived and did his portion of the Society's work in one town and the secretary did likewise in another town several miles distant. At the end of six months a magazine was brought forth. It had an editor and a business manager. To the two original offices were added two more, making a total of four offices from which the business of the Society was being carried on at the end of six months. Our letterheads carried the address—Los Angeles. True, but it has an area of as many square miles as there are days in the year, and so the address was rather indefinite. Memberships and subscriptions were being mailed to four different addresses causing confusion and delay. Executive Board meetings were being held in private homes, offices and school buildings.

It was not long, however, before our active Editor sensed the situation and at his own expense secured a studio in the Abbey San Encino in which he could carry on his editorial work and to which he invited the officers to meet to carry on the affairs of the Society, but the quarters are becoming inadequate.

Those who have guided the organization through two years of remarkable growth have done exceedingly well. In the JOURNAL of June, 1930, the Editor gave the first expression to our needs.

Let us now some reasons why the need of a home is becoming imperative.

1. A society with a membership approaching a thousand should have a permanent mailing address.
2. Out-of-town members visiting Los Angeles desire to see some material evidence of the organization.
3. The growth of the Society will soon demand an executive secretary. There should be a headquarters for such an officer.
4. There should be a central office for the executive officers.
5. There should be a larger room for Executive Board meetings.
6. There should be a room available for library purposes.
7. The editorial offices should be in close proximity to the library.
8. The expense of maintenance should be the Society's and not that of any individual member.
9. Permanent headquarters will help to make our Society a permanent institution.

That our Society has risen to the point of importance, dignity and size where a home is needed is the pride of every member. What our membership wills it can accomplish.

Why a home? The best interests of the Society demand it. Your President and Executive Board are working for it. A loyal membership will see that it becomes a reality.



By MARY NORWOOD LAWRENCE

The Santa Barbara Spring Flower Show will be held at the County Court House in that city this month, 27th, 28th, 29th. Included in the scheduled exhibits is Class IX, Succulents. There are ten divisions, in some of which several of our members will make a display. Prizes for 1st place and ribbons for 2nd and 3rd place to be awarded in each division.

Col. Perrie Kewen has recently received a letter from a fellow-member of the Cactus Society, Arturo F. Moeller, of Mexico, enclosing a list of the rarest cactus seeds which grow in that country, and which he himself, although a Civil Engineer by profession, collects and exports.

Mr. Moeller sent a beautiful collection to the Ibero-American Exhibition at Seville, Spain, last year, for which he was awarded the Grand Prix. On the cover-page of the July issue of this magazine is a photograph of *Lophophora williamsii cristata* which belonged to Mr. Moeller, and which was included in the exhibit sent to Spain.

In the past he has found several new plants which were not known scientifically, and this year two more are added to his credit. He lists fifteen varieties (the naming of which is an interest by itself) and mentions that "Mrs. John D. Wright of Santa Barbara, has every variety listed in my catalogue and the only possessor in your country of many of these plants, some of which are not listed."

"Mid-Winter Garden of the World"

The sixth annual Mid-Winter Flower Show at Encinitas drew more than the usual crowd of flower lovers, (and they expected 40,000 visitors!) and none was disappointed. This yearly demonstration is not intended to impress one with a pretentious quantity of blossoms but an effort to deserve the title of "Heart of California's Winter Flower Garden." While a great portion of our country is wrapped in cold and dormancy the open fields in that vicinity are yielding blossoms and fragrance for the universe. The showing of out-of-doors grown flowers cannot be duplicated in any other section of the country at this time of year.

The cactus and succulent displays were of special interest to readers of the JOURNAL, bringing members of the society from all over this state and Arizona, and winter visitors from many lands. The McCabe Gardens of San Diego won the blue ribbon and cash for the best exhibition of rare cactus and succulents. Young Mr. Wylie, also of San Diego, and the Alta Gardens, of Encinitas, carried off honors for rock garden arrangement.

None can outdo Miss Kate Sessions in energy and industrious endeavor. Years cannot down her. She exhibited a varied collection of Aloes which were an education in itself. Her post office address may be San Diego, but she belongs to the whole horticultural world.

This show is gaining in importance year by year, and with the friendly support of such men as E. O. Orpet, Miss Sessions, William Hertrich, Dr. Arthur Houghton and other nationally known horticulturalists the hope of San Diego County to be the winter garden of the world is not far from fruition.

RARE CACTI AND EXOTIC CACTUS SEED

Mr. Wilhelm Hennis, Jr., of Hildesheim, Germany, who is making an extensive collecting trip through Venezuela and Colombia for Cacti and Orchids, has given me the agency for the United States and Canada for his plants from the above mentioned countries and Cactus seed from Peru and Bolivia also. Here is an opportunity for importers to get some of the rarities from South America. The prices are reasonable, \$1.00-\$1.25 each, and postage, and will include such rarities as follows:

Neomamillaria mammillaris

Melocactus amoenus

Cephalocereus albispinus

Cephalocereus lanuginosus

Cephalocereus colombianus

Cephalocereus species

Cuttings of the *Cephalocereus* will be 20-30 cm. long.

OPUNTIA SEED SPECIAL

I have a fine supply of rare *Opuntia* seeds on hand as listed by Mr. Ferdinand Schmoll. These seeds are all rare types and at least five are hairy under glass.

20 sp. *Opuntia*, 1 gram of each, reg. \$2.75-\$2.25, including the following which may be had separately:

Opuntia cantabrigiensis 25c

Opuntia megarrhiza 20c

Opuntia crinifera 20c

Opuntia pilifera blanco 20c

Opuntia pilifera 20c

—All hairy under glass.

Very few growers have taken advantage of the low price on the four species of *Echinocactus ingens* as offered at 25c per gram. These seeds are very fertile and grow quite rapidly and make rare plants in the United States. The seed is of medium size and there are about 600 or more to a gram.

During March I hope to have the rare *Melocactus intortus* with a cephalium at least 2 inches tall at \$15.00 postpaid to California and Texas. Weight 15-20 lbs. Also more cuttings of the *Cephalocereus royerii* at \$5.00 per foot. Every cut with flowering areoles and also other rare species from the West Indies.

My seed catalogue, listing several hundred rare species of Cactus seed free upon request.

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EXCHANGES

Conducted by MRS. W. M. KETTERINGHAM
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The Exchange Department is conducted for the benefit of all subscribers to the Journal, and in order to expedite the handling of your requests for exchanges please accompany the list of plants you have for exchange with a stamped self-addressed envelope. Through this Department you will then be put in touch with some member or members of the Society who have the plants that you desire.

Exchanges Offered

Echinocactus horiziontalonius; *Echinocactus viridescens*; *Trichocereus buascha*; *Trichocereus spachianus*; *Opuntia variegata*; *Opuntia treleasei*, rare; *Echinopsis multiplex*; *Aloe brevifolia*; *Agave*, sp. from New Mexico; *Lophophora williamsii*; *Mesembryanthemum deltoides*; *Crassula perfoliata*; *Sempervivum tectorum*.

All the above plants are well rooted and in soil and owner wishes to exchange for *Cereus marginatus*, *C. peruvianus*, or any South American or Mexican *Cereus*; *Cephalocereus senilis* seedlings; *Astrophytum myrtilloides*, large or seedlings; *Agave parvifolia*, *A. victoria regina*, *A. filifera*, *A. ferox*; *Euphorbia Obesa* seedlings; any *Haworthia* or *Gasteria*.

Other Exchanges Offered Include

Several *Opuntia ramosissima* Cristata, well rooted. 2,000 Mexican and South American Cactus seedlings. Many mesembryanthemums, including *M. speciosum*, *Oreocereus irigoyenii*.

A member wishes to exchange *Peniocereus greggii* (all sizes) for other of the rarer members of the *Cereus* family.

Any cacti is wanted in exchange for the following plants which can be supplied in small, medium, large, single or clump: *Opuntia ursina*, *O. acanthocarpa*, *O. ramosissima*, *O. busilaris* (red or green leaf); *Sclerocactus polyancistrus*; *Echinocereus engelmannii*, in brown, straw, black or mixed; *Echinocactus leconteii*, bright red, straw or mixed black; *Yucca*, sp.

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